

The Examiner has rejected claims 1-7 and 29 under 35 U.S.C. § 103 as being unpatentable over Singh et al. taken with Dote et al., Erlich (U.S. Patent No. 2,446,913), Wilson (U.S. Patent 3,721,568), Ganguli et al. (U.S. Patent No. 5,998,641) and Langley et al. (U.S. Patent No. 5,801,140). As the Examiner is aware, when relying upon references to establish a *prima facie* case of obviousness under § 103, the examiner must establish that the prior art teaches or suggests each and every claim limitation. MPEP § 2143.03. As will be shown by the ensuing discussion, the Examiner has not met this burden.

Singh et al. taken With Dote et al. Erlich, Wilson, Ganguli et al., and Langley et al, do not teach or suggest all the claim limitations

The present invention, as defined by claims 1-7 and 29 in the application, is directed to a novel process for recovering substantially oil/fat free products from the whole stillage produced in the production of ethanol. In the first step of applicant's process, the whole stillage is separated into the wet distillers grain stream and the thin stillage stream. In the second step, one or both of these streams are treated to remove the oil/fat from the stream(s). Thus claim 1 of the application requires that the distillers grain stream and/or the thin stillage stream be treated to remove the oil when it is *wet*, i.e. *before* the stream is subject to any type of drying phase.

The Examiner, in essence, is presenting two contentions. First, the Examiner is arguing that Singh, taken with Dote, Erlich, and Wilson, teaches the afore-mentioned limitation i.e. subjecting distillers grain/thin stillage to an oil removal phase when they are *wet* streams. Second, and in the alternative, the Examiner argues that there is nothing

to suggest that the oil removal stage differs substantially whether the material subjected to the process is dry or wet.

In essence, the Examiner is arguing that even if the combined prior art does not teach or suggest this limitation, a rejection would still be appropriate because such a limitation is not functionally important.

The applicant respectfully disagrees with both of the Examiner's assertions. First, Singh, taken with Dote, Erlich, and Wilson, does *not* teach or suggest the limitation of subjecting *wet* streams to an oil removal phase. The Examiner correctly concedes that neither Singh nor Dote disclose this specific limitation because both these references teach the step of oil removal from *dried* thin stillage streams/*dried* distillers grain streams. However, the Examiner contends that Singh and Dote, in conjunction with Erlich and Wilson, do teach or suggest this step. The Examiner, citing Erlich and Wilson, argues that it would have been obvious to modify the raw materials of the processes of Singh and Dote by replacing their dried compositions with wet streams. The applicant respectfully disagrees with the Examiner's assertion. In the process as disclosed by Erlich, the wet stillage stream is treated via centrifugation and then introduced through several ion exchanging tanks to remove cations and anions, whereby products such as proteinaceous compounds, mineral salts, carbohydrates, vitamins etc are subsequently recovered. Applicant fails to see how this leads to the teaching or suggestion that the wet stream of Erlich can be subjected to an oil removing process to recover substantially fat/oil free products, as there is no hint or suggestion of such a teaching. The fact that Erlich discloses that wet streams can be treated by Process A, does not automatically teach or suggest that the wet streams can also therefore be treated

by Applicant's process B, which is an unrelated process with different goals. As the Examiner is aware, to establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Furthermore, the Wilson reference does not teach or suggest such a limitation either. In fact, Wilson does not even teach the treatment of *wet* streams, but instead specifically teaches drying of the streams. Finally, none of the other references cited by the Examiner, Ganguli et al., or Langley, teach or disclose such a limitation either. Accordingly, the combination of Singh, Dote, Erich, Wilson, Ganguli, and Langley does *not* teach or suggest each and every limitation of claim 1 in applicant's application. Therefore, the Examiner's obviousness rejection of independent claim 1, claims 2-7 dependent thereupon, and independent claim 29, should be withdrawn.

As to the second argument that the Examiner has presented, i.e. that even if the combined prior art does not teach or suggest this limitation, a rejection would still be appropriate because such a limitation is not functionally important, the applicant again disagrees with the Examiner's contention. The requirement that the oil be removed from *wet* streams, as opposed to dry streams, is a significant and functionally important step in the applicant's process, as it provides for various advantages that will be discussed shortly.

At this point, it would be beneficial to present a brief overview of the related prior art. Obtaining oil/fat free products from whole stillage is known in the prior art, yet as evidenced by the Singh and Dolte references, the prior art process involves the treatment of *dry* material as opposed to *wet* streams. Accordingly, in the prior art, and unlike

applicant's process, the stream is first subjected to an initial drying step, before subsequently being subjected to oil removal. In the prior art, this oil removal phase often involves extraction of the oil by polar solvents such as hexane, propane, octane, etc. The use of such polar solvents to extract the oil is necessitated when the stillage material is dry, as opposed to being wet. On the other hand, in applicant's process, a non-polar solvent, such as water, can be utilized to extract the oil.

The advantages of applicant's process over the prior art process will now be discussed. The first advantage is that heat is not utilized in applicant's process, and this therefore eliminates the risk that the process materials, the extracted compounds, and/or the resulting products will undergo denaturing or a material change. For example, in applicant's process, carotenoids and sterols are two compounds which are extracted simultaneously along with the fats/oils, from the wet streams. These carotenoids and sterols are heat-sensitive, and thus if heat were to be applied to dry the streams prior to oil extraction, then this would result in these compounds becoming materially altered and losing their biological value. However, applicant's process avoids such an adverse result because heat is not involved. A second advantage to applicant's process, as compared to the process of the prior art, is that a non-polar solvent, such as water, can be utilized during the oil removal phase to extract the fats/oils from the wet streams. On the other hand, in the prior art process, a polar solvent is utilized. As discussed above, the use of polar solvents, such as hexane, propane, octane, etc., to extract oil, is necessitated when the stillage material is dry, as opposed to being wet. The disadvantage in this is that these polar solvents are less stable than non-polar solvents. This in turn increases the risk of undesired chemical reactions occurring between such polar solvents and the involved

materials. Furthermore, another disadvantage in utilizing such polar solvents to extract the oil is that these solvents possess a greater polarity than that of the oil, and thus compounds that would otherwise be extracted in the oil, are instead left behind in the dry stillage. However, these disadvantages are avoided in applicant's process because, as discussed above, the solvent utilized to extract the oil is a stable, non-polar solvent, such as water. This prevents unwanted chemical reactions from occurring, and allows for the recovery of other compounds that one may wish to recover along with the extracted oil/fat, such as carotenoids and sterols. Finally, a further advantage that is conferred by treating wet streams, as opposed to dry material, is that after the oil/fat compounds have been extracted, the remaining slurry can be subjected to further aqueous processing. In the prior art process, however, once the oil/fat compounds have been extracted from the dry stillage, further processing is not possible, in the absence of rewetting the remaining dry material to solubilize it, which is both time-consuming and inefficient.

The foregoing discussion establishes that the extraction of oil from *wet* streams, as opposed to *dry* material, has many advantages. Therefore, the requirement that the oil be removed from *wet* streams, as opposed to *dry* material, is a significant and functionally important step in the applicant's process that cannot be ignored. Furthermore, as discussed above, none of the references, or combination of references, cited by the Examiner teach or disclose such a limitation. Therefore, the Examiner's obviousness rejection of independent claim 1, claims 2-7 dependent thereupon, and independent claim 29, should be withdrawn.

Based upon the foregoing comments and amendments, the application is believed to be in condition for allowance, and an early Notice of Allowability is

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respectfully requested. If the Examiner believes a telephone conference will expedite the disposition of this matter, the Examiner is respectfully invited to contact this attorney at the number shown below.

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